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| Image result for adamas university logo | **ADAMAS UNIVERSITY**  **END SEMESTER EXAMINATION**  (Academic Session: 2020 – 21) | | |
| **Name of the Program:** | M. Tech. (Env. Engg) (CE) | **Semester:** | 1st |
| **Paper Title:** | Process Chemistry for Water & Wastewater Treatment | **Paper Code:** | ECE61109 |
| **Maximum Marks:** | 50 | **Time Duration:** | 3 Hrs |
| **Total No. of Questions:** | 17 | **Total No of Pages:** | 02 |
| *(Any other information for the student may be mentioned here)* | 1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code and Date of Exam. 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer. | | |

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| **Group A**  **Answer All the Questions (5 x 1 = 5)** | | **Knowledge Level** |  |
| 1 | The world’s available fresh water supply is about \_\_\_\_\_\_\_ percent of that total water supply.  a) 10 b) 4 c) 3 d) 7 | **U** | **CO1, CO2** |
| 2 | Which of the following related to the aerobic organic matter is true?  a) Essential nutrients for growth b) Development of sludge deposits c) Growth of undesirable aquatic life d) Development of septic conditions | **R** | **CO1, CO4** |
| 3 | Organic matter + nutrients + O2 → CO2 + H2O + \_\_\_\_\_\_\_   1. Biomass   b) O2 c) Nutrients d) Organic matter | **U** | **CO3** |
| 4 | Which among these is the alternative BOD test for determining the oxygen consuming potential of a wastewater?  a) ThOD (Theoretical Oxygen Demand) b) COD c) TOC (Total Organic Content) | **Ap** | **CO4** |
| 5 | What is stoichiometry?  a) A quantitative relationship between reactants and products b) Defines a qualitative value of the reactants and products c) Defines the quantity of reactants and products upon reaching equilibrium d) It defines quantity of only reactants | **U** | **CO4,**  **CO5** |
| **Group B**  **Answer All the Questions (5 x 2 = 10)** | | | |
| 6. | i) What is required to keep the activated sludge suspended? ------ Oxygen  ii) Which method combines aeration basin and secondary clarifier into single unit? ---- Sequential batch reactor | **R** | **CO1, CO2** |
| 7. | i) When the aeration system shuts off, the basin begins to perform with which unit? – Explain. ---- Secondary clarifier | **U** | **CO1, CO2** |
| 8. | i) In drum type screen, which axis does the drum rotate? ------- Horizontal  ii) Which is the primary force acting on the Settleable particles? ----- Gravitational force | **U** | **CO3** |
| 9. | i) For the removal of BOD through Activated Sludge Process (ASP) what would be the Solid retention time considered? ------ 1-2 days  ii) Which process does not involve mass transfer in terms of water treatment? ---- Clarification | **R** | **CO3,**  **CO4** |
| 10. | i) Calculate the BOD load for the following data. Flow: 800 m3/d BOD load: 1000 mg/L ------- 800 kg/d | **U** | **CO3,**  **CO4,**  **CO5** |
| **Group C**  **Answer All the Questions (7 x 5 = 35)** | | | |
| 11. | 1. Define the oxidation ponds. 2. Name with details the different types of oxidation ponds. | **U, R** | **CO1** |
| 12. | What are the different kinds of lagoon design depending on the conditions? Briefly explain. | **U, Ap** | **CO2** |
| 13. | Name and discuss in details the two different configurations of MBR. |  | **CO3** |
| 14. | Draw and explain the symbiosis of the oxidation pond. | **U** | **CO4** |
| 15. | Why more than one lagoon is recommended for wastewater treatment? Give reasons. | **U** | **CO5** |
| 16. | States in a tabular format the advantages & disadvantages of the two configurations of MBR process. | **U, R** | **CO4,**  **CO5** |
| 17. | A BOD test was conducted at 200C in which 15 mL of waste sample was diluted with dilution water to 300 mL. Calculate 5-day BOD at 200C.  [Given :  Initial DO of the diluted sample D1 = 8.8 mg/L  Final Do after 5 days D2 = 1.9 mg/L  Initial DO of seeded dilution water B1 = 9.1 mg/L  Final DO of seeded dilution water B2 = 7.9 mg/L] | **U, Ap** | **CO4,**  **CO5** |